Finite Filters for Landfill Gas Conversion

Market Application Publication

Background

There are over three million landfills in the United States. Although often perceived as both a health issue and an eyesore, landfills and their build-up of waste can have a positive outcome. Over time, the waste eventually decomposes and produces landfill gas (LFG.)

LFG is composed of 55 percent methane, 45 percent carbon dioxide (CO2), along with small amounts of nitrogen, oxygen, hydrogen, less than one percent nonmethane organic compounds, and trace amounts of inorganic compounds. LFG gas causes local smog, health and safety issues, and, quite simply, many unpleasant odors. Additionally, methane is a potent greenhouse gas that contributes to global climate change.

Benefits of Landfill Gas Conversion

- Turns gas produced by waste into usable energy (electricity, heat, steam)
- Reduces greenhouse gas emissions
- Reduces local pollution, safety hazards, and unpleasant odors
- Possible decrease in energy costs

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Application

Researchers have found that the same methane that comes from landfills can be turned into usable energy. Vertical wells are placed throughout a landfill to extract the gas. A compressor then uses suction to pipe the gas into one central location. The gas is treated to remove particulate matter, moisture, carbon dioxide and often trace gases. The gas is then ready to be used as a form of energy.

There are two primary uses for landfill gas. The first and simplest is a medium-Btu gas (approximately 550 Btu per standard cubic foot). This gas can be used or sold for industrial boilers-burners, cogeneration (heat and electricity), electrical generation, on-site space heating and/ or hot water heating, lighting and recreational uses. When used for these applications, the only processing required is water and particulate removal.

The second use is as a high-Btu gas (approximately 1,000 Btu per standard cubic foot after processing to remove the carbon dioxide). Pipeline quality gas (high-Btu gas) can be used for any application for which natural gas is used. However, in addition to moisture and particulate removal, processing includes CO2 and trace compound removal.

Converting landfill gas benefits the landfill operators, communities, and industrial users. The Environmental Protection Agency actively promotes the conversion of LFG to energy. There are many current projects, and more planned for the future, for converting LFG into energy.

Possible Effects of Improper Filtration on an LFG System

The gas contains chlorinated hydrocarbons, which are common and lead to the formation of HCl.

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During compression, these acids mix with the lube oil and can corrode bearings, corrode wrist pin bushings, cylinder sleeves, pistons and piston rings.

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Also during compression particulates can cause excessive wear on expensive equipment.

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Moisture in the gas can rust gas regulators and carburetor components and carries acid in solution.

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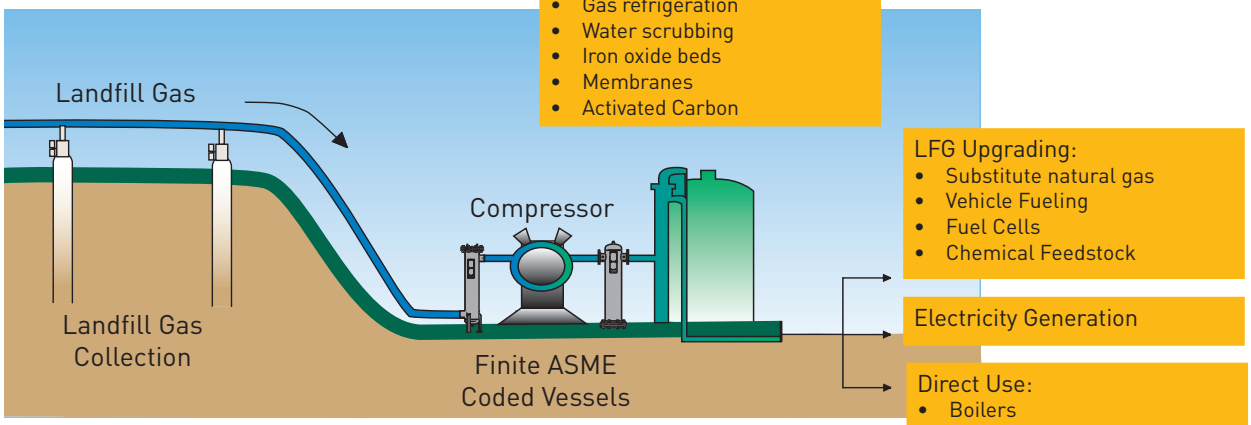
Compressor oil carryover additives contain excessive barium, calcium and others. They can also cause spark plug and combustion chamber composites, gas regulator fouling, cylinder varnishing, and piston ring sticking.

The Parker Solution

Finite® Filter offers an array of filters sized to handle any landfill gas flow and several media choices to meet LFG application demands. Filter housings are constructed from carbon steel and stainless steel. Choices of filter media types include glass fiber for coalescing liquids, cellulose for particulate removal and activated carbon materials for oil vapor and hydrocarbon removal. Filter element ratings are available from 100 micron down to 0.01 micron.

Finite's grade 7CVP pleated glass fiber media (0.5 micron, 99.5% efficiency) is ideal for lower pressure (blowers and compressor inlet) applications. The glass fiber for this media is saturated with fluorocarbon to minimize pressure drop.



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